DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Fact Sheet (FS) for permit modification

Permittee:	City of Bozeman
Permit No.:	MT0022608
Receiving Water:	East Gallatin River
Facility Information:	Bozeman Wastewater Treatment Plant
Mailing Address:	255 Moss Bridge Road Bozeman, MT 59718
Contact:	Tom Adams, Superintendent
Phone:	(406) 586-9159
Fax:	(406) 586-7017
E-mail:	wwtp@bozeman.net
Fee Information:	
Type:	Publicly Owned Treatment Works, Major
Number of Outfalls:	1 (For Fee Determination only)
Outfall - Type:	001 – Plant Discharge

I. Permit Status

The existing City of Bozeman, MPDES permit was issued on August 31, 2006, becoming effective on October 1, 2006. The City of Bozeman submitted a letter of appeal to the Board of Environmental Review (Board) on the proposed permit on September 29, 2006. The letter of appeal requested a hearing before the Board, to reverse or modify the Department's action on the permit.

The Board granted a stay on the hearing request to allow both parties time to attempt resolution of the appealed conditions. The Department, based on additional information currently available [Administrative Rules of Montana (ARM) 17.30.1361(2)(b)], is proposing to modify the existing MPDES permit to resolve the appeal. The individual permit requirements to be modified will be identified in the next section.

II. Facility Information

a. Current Facility Description

The current treatment facility consists of primary sedimentation with secondary treatment utilizing complete mix, activated sludge with fine bubble aeration. The hydraulic capacity of the facility is rated at 5.8 million gallons per day (mgd). Currently the facility disinfects its effluent with chlorine and de-chlorinates with sulfur dioxide. Eighteen Infiltration/Percolation (I/P) beds was incorporated in the original design for additional ammonia removal. The facility is able to fully nitrify the wastewater in the secondary treatment process and has not needed the I/P cells to meet permit limits for ammonia.

b. Proposed Facility Description

The Bozeman Wastewater Treatment Plant (WWTP), Phase I upgrade will entail construction of the following new facilities: headwork's building, primary influent lift station, two biological nutrient removal (BNR) trains, a RAS/WAS pumping station, a parallel outfall line, UV disinfection facilities, one additional anaerobic digester, and a new laboratory/administration building. The facility's (Phase I) hydraulic design is 8.5 mgd (daily average flow) with a peak hydraulic flow of 10.5 mgd. The ultimate hydraulic capacity for the facility will be 13.9 mgd (average daily flow) at the conclusion of the third phase in year 2025.

With the use of the Winter Modified Johannesburg (WMJ) BNR process, the facility proposes to achieve the following levels of treatment: 5-day biological oxygen demand ($BOD_{5)}$ <5 mg/L, total suspended solids (TSS) <5 mg/L, Total Nitrogen (TN) <10 mg/L, and Total Phosphorus (TP) <0.2 mg/L. At this level of treatment, the nutrient concentrations in the effluent be reduced by >37% for TN and >94% reduction in TP.

III. Water Quality Based Effluent Limitations (WQBELs)

In the appealed permit, the Department imposed nutrients limits to prevent additional loads of total nitrogen and total phosphorous from being discharged to the East Gallatin River. A companion compliance schedule was developed to require the permittee to develop and submit a plan and schedule for reactivation of the infiltration/percolation (I/P) beds to help achieve these limits. A ground water monitoring plan was imposed to evaluate any influences to groundwater from the I/P beds. The permit limits for nutrients were developed using operational data from the WWTP on a seasonal basis and implemented on a seasonal basis.

In the letter of appeal submitted to the Board, the City argued nine points by which they objected to the imposition of nutrient loads in the proposed permit. To eliminate these concerns, the Department is modifying the appealed permit to reflect the new information brought forward. The City argued that, while the I/P beds could possibly be effective in achieving the nutrient load limits during the growing season, they would not achieve the non-growing season load limits due to operational limitations of the I/P beds(i.e. ice buildup and freezing conditions).

The City also questioned the use of operational performance data from the WWTP, as opposed to water quality standards to calculate load limits for nutrients discharged into the East Gallatin River. The City argues the rational is arbitrary and not based on criteria and standards adopted by the Department.

The City presented information that without an effective treatment process, they would have to physically modify the existing aeration basins at a capital cost of $150,000~$200,000 and yearly operational cost could reach $165,000 to $200,000 per year. The City could not recoup these costs in light of the city's commitment to upgrade the facility to a biological nutrient removal (BNR) process. The City has committed $55 million dollars for the proposed facility upgrade. The City has signed a Notice to Proceed (NTP) on April 16, 2007 with HDR Engineering and Morrison-Maierle, Inc. to initiate site characterization and process design activities.

The Department is proposing the following permit modifications to address the City's appealed conditions:

1. The Department will remove the compliance schedule for the submittal of a plan and schedule for the reactivation of the I/P beds and the accompanying ground water monitoring. Language will be inserted into the permit restricting the use of the I/P beds to emergency conditions only.

2. A new compliance schedule will be inserted requiring the permittee to upgrade its treatment process. The compliance schedule will have the following milestone dates:
    a. The permittee shall approve final waste water plant upgrade designs and have bid documents ready for publication by August 1, 2008,
    b. The permittee will achieve substantial completion of construction activities for the facilities upgrade by March 1, 2011, and
    c. The permittee will successfully start-up and commission the new BNR trains and meet final effluent limits by September 30, 2011. (Personal communications with Tom Adams, April 24, 2007)

    The permittee will be required to submit semi-annual reports (August 28 and January 28), annually, showing progress towards completion of the aforementioned milestones, and the viability of meeting final compliance dates.

3. A final effluent compliance date for nutrient limits (TN and TP) will become effective on September 30, 2011. The nutrient limits developed in the appealed permit will not be modified.

IV. Final Effluent Limitations

Effluent limits developed in the permit issued on August 31, 2006 will remain fully effective and enforceable except for the following. The effective date for the TN and TP limits will become effective on September 30, 2011.

Table 4. Final Effluent Limitations

Parameter	Concentration, (mg/L) [1]			Load, (lb/day) [1]	
	Daily Maximum	30-Day Average	7-Day Average	7-Day Average	30-Day Average
5-Day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	NA	25	40	1,928	1,072
Total Suspended Solids (TSS)	NA	30	45	2,169	1,083
Escherichia coli (cfu/100 ml), April through October, geometric mean	252	126	NA	NA	NA
Escherichia coli (cfu/100 ml) November through March, geometric mean	1,260	630	NA	NA	NA
Total Residual Chlorine (TRC)[2]	0.019	0.011	NA	NA	NA
Total Ammonia, as N	3.15	1.52	NA	NA	NA
Total Nitrogen, (lb/day)	971[3][4]	NA	NA	NA	783
	1072[4][5]	NA	NA	NA	864
Total Phosphorus as P (lb/day)	199[3][4]	NA	NA	NA	160
	211[4][5]	NA	NA	NA	170

(1) See the definitions in Part V. of the permit for explanation of terms
(2) Limits apply when chlorine is used for disinfection purposes.
(3) Effective during the growing season, June 1 through September 30. Limits effective September 30, 2011.
(4) Daily maximum load limitation.
(5) Effective during the non-growing season, October 1 through May 31. Limits effective September 30, 2011.

Effluent pH shall remain between 6.0 and 9.0 unless a variation is due to natural biological processes. For compliance purposes, any single analysis and/or measurement beyond this limitation shall be considered a violation of the conditions of this permit.

The arithmetic mean of TSS and $CBOD_5$ for effluent samples collected in a period of 30 consecutive days shall not exceed 15% of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period (85% removal). This is in addition to the concentration limitations on TSS and $CBOD_5$.

The instantaneous maximum limitation for Oil and Grease in any grab sample shall be 10 mg/L, (ARM 17.30.637(1)(b)).

There shall be no acute toxicity in the effluent (ARM 17.30.637(1)(d)).

Limits established for total residual chlorine (TRC) have been calculated in this permit (Maximum Daily Limitation of 0.019 mg/l). Based on the currently available technology, method detection limits for residual chlorine are 0.1 mg/l. Any sample with analytical results less than this amount (0.1 mg/l) will be considered in compliance with permit limitations for TRC.

V. TMDL Status

On September 21, 2000, a US District Judge issued an order stating that until all necessary total maximum daily loads under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment, the State is not to issue any new permits or increase permitted discharges under the MPDES program. The order was issued under the lawsuit Friends of the Wild Swan vs. US EPA *et al*, CV 97-35-M-DWM, District of Montana, Missoula Division.

The Montana Water Quality Act (Act) authorizes the issuance of point source discharge permits on a listed water body pending completion of a TMDL provided that: 1) the discharge is in compliance with the provisions of 75-5-303, MCA (nondegradation policy); and 2) the discharge will not cause a decline in the water quality of the parameter for which the water body is listed [75-5-303(10), MCA].

The Department found that the renewal and re-issuance of this permit, did not conflict with Judge Molloy's Order (CV97-35-M-DVM) because the discharge of nutrients was limited through the load limits on nutrients. The load limits in the appealed permit dose not cause the discharge to be considered a "new or increased source" under ARM 17.30.702(16), thus meeting the intent of judge Molloy's order.

The Department in fulfilling the Act's requirements, focused on two main issues:

1. The receiving water at the point of discharge (waterbody number MT41H003-12) is listed on the 1996 303(d) list, and
2. The next downstream segment of the receiving water (waterbody number MT41H003-13) downstream from the point of discharge is on the 1996 list as well.

Causes of impairment included: flow alteration, nutrients, other habitat alteration, suspended solids, unionized ammonia, and pH. Probable sources include: agriculture, irrigated crop production, land development, municipal point sources, other urban runoff and pasture land.

In subsequent 303(d) lists, insufficient credible data were available to determine impairment status. However, the Department has finalized the 2006 303(d) list of impaired waters that list the same two reaches identified above (renamed MT41H003_020 and MT41H003_030) as impaired. Causes of impairment included: flow alteration, nutrients (total nitrogen and total phosphorus), pH, excess

algal growth, and other habitat alteration. Probable sources include: riparian grazing, irrigated crop production, municipal point sources, and yard maintenance.

All of the above suggest that the East Gallatin River are experiencing water quality problems associated with pollutants that are currently being discharged from the Bozeman WWTP, particularly nutrients. Although the TMDL process has not yet begun for the East Gallatin River or immediate downstream water bodies, it is likely that load reductions for nutrients will be sought when the TMDLs are completed in the future.

Nutrient limits will remain in the permit, but a compliance schedule will be inserted to require upgrade of the facility to reduce nutrient loads discharged into the receiving water. These load limits will prevent any increased discharge to the receiving water. These nutrient limits are interim measures and once the TMDL development process is finalized, further restrictions on TN and TP loads will likely occur.

IV. Special Conditions/Compliance Schedules

ARM 17.30.1432 requires permittees to furnish to the Department, within a reasonable time, information which the Department may request to determine compliance with this permit.

a. Facility Upgrade

The City of Bozeman is required to upgrade their WWTP to effectively treat the additional hydraulic capacity and biological requirements of additional flows from the municipality. The effective level of treatment shall be such that the limits for TN and TP will be met upon commissioning of the facility. The compliance schedule will have the following milestone dates:

1. The permittee shall approve final wastewater plant upgrade designs and have bid documents ready for publication by August 1, 2008,
2. The permittee will achieve substantial completion of construction activities for the facilities upgrade by March 1, 2011, and
3. The permit will successfully start-up and commission the new BNR trains and meet final effluent limits by September 30, 2011.

The permittee will be required to submit semi-annual reports (August 28 and January 28) annually, showing progress towards completion of the aforementioned milestones, and the viability of meeting final compliance dates.

b. Emergency use of the I/P beds

Should the facility experience an upset, whereas the I/P beds are used for emergency treatment, the permittee will be required to notify the Department and submit reports of the conditions as stipulated in Part II. I, of the permit. Use of the I/P beds will not be considered a bypass of treatment facilities as defined under Part III. G, of the permit. Effluent discharged to the I/P beds shall receive at a minimum, primary treatment.

In accordance with ARM 17.30.1342(11), all reports, plan or information submitted to the Department must be signed and certified in accordance with Part IV.G of the permit and ARM

17.30.1323. Legible copies of these reports shall be submitted to the Department at the following address:

Montana Department of Environmental Quality
ICIS Coordinator
Water Protection Bureau
PO Box 200901
Helena, MT 59620-0901
Phone (406) 444-3080

XII. Information Sources

Clean Water Act (CWA), 33 U.S.C. 1251 *et seq.*

US Code of Federal Regulations, 40 CFR Part 122 -The National Pollutant Discharge Elimination System.

US Code of Federal Regulations, 40 CFR Part 133 –Secondary Treatment Regulation.

Montana Water Quality Act, MCA 75-5-101 *et seq.*

ARM Title 17, Chapter 30, Sub-chapter 13 - Montana Pollutant Discharge Elimination System (MPDES) Permits.

"Montana List of Waterbodies in Need of Total Maximum Daily Load Development," 303(d) list, dated 1996 and 2006.

Montana Pollutant Discharge Elimination System permit No.: MT0022608, Issued to the City of Bozeman on August 31, 2006

City of Bozeman, 'Appeal of Final Decision for the Department's MPDES Permit No. MT0022608/ Request for hearing before the Board' Sept. 29 2006

Prepared by: J Lloyd, July 2007, revised September 2007.